Invasive Species Early Detection Monitoring Protocol for Klamath Network Parks

Standard Operating Procedure (SOP) #4: Setting up the Electronic Field Equipment

Version 1.00 (February 2010)

Revision History Log:

Previous Version	Revision Date	Author	Changes Made	Reason for Change	New Version

This SOP explains the process for setting up the handheld Pocket PC, Global Position System (GPS), laptop computer, and laser rangefinder to collect and store data associated with this protocol. This SOP describes the process associated with using a Trimble GeoExplorer 2005/08 series Pocket PC, a Garmin 60 or 76 series GPS unit, and the TruPulse 200 Laser Rangefinder. It is expected that this equipment will be updated throughout the life of the protocol. This SOP will need to be updated accordingly.

Review of the Data Collection Methods

As part of this protocol, the Klamath Network (KLMN) will collect data digitally and in hardcopy format for the first few years of the project. Hardcopy datasheets will be compared to data collected digitally to ensure the data's accuracy. Data will be collected using an integrated system of hardware and software that works to simplify the collection and management of invasive species data. The central piece of the data management system is the relational MS Access database that works to keep track of all weed occurrences, random plots, survey information, and treatments. This database will be used in combination with a handheld Pocket PC (Trimble series) to facilitate field data collection. The database was designed using the NPS Natural Resource Database Template (NRDT) and incorporates many of the features currently available with The Nature Conservancy (TNC) weed information management system (WIMS) database. For more information on the database for this project see SOP #9: Databases.

Setting Up the Trimble GeoExplorer Pocket PC

Prior to preparing the Trimble units for data collection, it is the responsibility of the Crew Lead to provide the Data Manager with shapefiles showing the sites that will be surveyed that year, the contact information for each crew member, and a species list of all the species being surveyed (SOP #2: Field Work Preparation). Once the Data Manager has the sites and species list, it is his/her responsibility to set up the Pocket PC. The Pocket PC settings should be completed in the following manner.

On the Pocket PC, under the start menu select [Settings]. At the bottom of the screen select the [System] tab. Open [System Information]. Go to the following Trimble web site: http://www.trimble.com/geoxt_ts.asp?Nav=Collection-9554 and make certain the Pocket PC has the most up-to-date software.

Make certain the latest available version of ESRI ArcPad, Trimble GPSCorrect, and ActiveSync is loaded onto the Pocket PC. ActiveSync must also be loaded on the Desktop.

Load the DateTime.shp and PlotLocn.shp files onto the Pocket PC following the steps below. NOTE: You CANNOT get the database from the TNC web site since the database has been altered to meet the needs of the KLMN.

Open ArcPad on the Pocket PC and tap the small drop-down arrow next to the GPS Tools  and tap on [GPS Preferences].

There are several tabs at the bottom of the screen. For the **GPS tab**, set the following:

Protocol = Trimble GPScorrect
Port = Com3: TSIP Serial Port
BAUD = 9600
Make certain the following are check marked: "Automatically Active," "Show GPS Activity in System Tray," and "Automatically Pan View."
On the **Capture tab**, set the following:
Checkmark "Enable Averaging"
Points = 30
Vertices = 5
Position Interval = 1
Distance Interval = 5
On the **Quality tab**, set the following:
Checkmark "No Warnings"
On the **GPS Height tab**, set the following:
Antenna Height = 3
Geoid Separation = 0
Checkmark "Use Map Units for Height Units"
Checkmark "Use Height in Datum Transformation"
On the **Datum tab**, set the following:
GPS Datum = D_WGS_1984
On the **Alerts tab**, set the following:
Turn off all the alerts should be turned off
On the **Location tab**, set the following:
Latitude, Longitude, and Altitude will automatically populate
Checkmark "Restore Location"
DST Distance Alert = 10 and units should be = m

Tap the small drop-down arrow next to the GPS Tools  and tap on [Trimble GPScorrect].
Tap [Logging Settings] and make certain the settings are correct.

Log GPS to SSF = On
Log H-Star Data = No
Antenna Height = 3.000 m
Tab [GPS Settings] and make certain the settings are correct.
DOP Type = PDOP
Max PDOP = 12
Min SNR = 39
Min Elevation = 15
Velocity Filter = Auto
Tab [Real Time Settings] and make certain the settings are correct.
Choice 1 = Integrated SBAS
Choice 2 = Use Uncorrected GPS
Real-Time Age Limit = 4 min
Load the weeds, site, and pick list data onto the Pocket PC using the process outlined in SOP #9: Databases.

Setting Up the Garmin 60/76 GPS Unit

Field crews mainly use the Garmin GPS unit to navigate to the beginning of the site. In the event that a GPS coordinate cannot be obtained using the Trimble unit, the Garmin unit may be used to get the GPS coordinates, which should then be hand entered into the Trimble unit (SOP #6: Data Collection and Entry). It is the responsibility of the Data Manager to prepare the GPS units for the field crews. The following steps should be used to prepare the GPS units.

Make certain you have the latest version of the program DNR Garmin. This program can be obtained from the following web site:
http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html

Obtain the following layers from the GIS Specialist:
Trails and Roads to be surveyed, broken down into segments
Park Boundaries
All roads and trails for a park
Invasive species locations from previous I&M visits
Invasive species locations from park visits

Make certain all the layers are in a WGS84 projection.

Use DNR Garmin and the following steps to load the GPS data onto the Garmin units.

Open DNR Garmin and go to [file→ load from file] and under "Files of type" select [ArcView Shapefile].

Make sure the Garmin is plugged into the computer and is recognized by the DNR Garmin program.
Depending on if you are loading routes or waypoints, click on the proper drop-down menu and select upload.

Repeat these steps for all GIS layers.

Use the program Topo Pro for ArcGIS to upload background imagery, if desired by the field crew.

Once you have the data loaded, go to the main menu in the Garmin unit and select [Setup].

Use the default settings for this unit with the exception of the following changes:

Under [setup→system] make certain WASS / EGNOS is "Enabled."

Under [setup→map] make certain the proper maps are showing for the areas where you will be surveying.

Under [setup→time] change the format to [24 hour] and make certain the time zone is [US - Pacific].

Under [setup→units] change the format to [hddd mm ss.s], Map datum should be WGS 84, Distance = Metric, Elevation = Meters (m/min), Temperature = Celsius.

Setting up the TruPulse Laser Rangefinder

The TruPulse Laser Rangefinder has three buttons, an up and down arrow on the left side of the unit, and the "fire" button on the top of the unit. Make certain the unit has new batteries and then follow these basic steps to set-up the unit:

Hold the down arrow button down for 4 seconds while looking through the eye piece of the unit. You should see the words "UnitsS." Push the fire button and you should see a measurement type (Yards, Meters, Feet) under the UnitsS caption. Use the up and down arrows to set this to [Meters]. Hit the fire button once you have selected meters.

Look through the eyepiece and at the bottom of the screen you should see one of the following SD, VD, HD, INC, HT. Use the up and down arrow to set this to SD (Slope Distance).

Setting Up the Laptop Computer

Prior to heading into the field, the Data Manager should load the field project folder onto the desktop of each laptop to be used. The field project folder should be renamed to include the initials of each crew member that will be using the folder and the current year separated by underscores (e.g., DO_SM_2008). The field project folder contains the six subfolders described below.

Project_Database. This is the Access database into which data from the Trimble units will be loaded each night (SOP #9: Databases, SOP #6: Data Collection and Entry).

Documentation. This folder will contain any documentation that might be needed while in the field (e.g., ISED Protocol, Equipment User Guide).

GIS_Data. This folder contains a copy of all the GIS data that were loaded on the Trimble unit and Garmin unit prior to starting the field season. These data are available as a backup in case something goes wrong with the layers on the handheld units.

Backup. At the end of each day, the field crew will place into the folder a copy of the Assessment, Occurrence, and Treatment shapefiles on their Trimble units. This will act as a backup of the data collected in the field in case something goes wrong with the handheld units.

Identification. This folder will contain any information needed to help with the identification of invasive plants (e.g., Identification Guide, ID Cards).

Other. An addition folder that can be used for any data files that do not "fit" into one of the above categories.

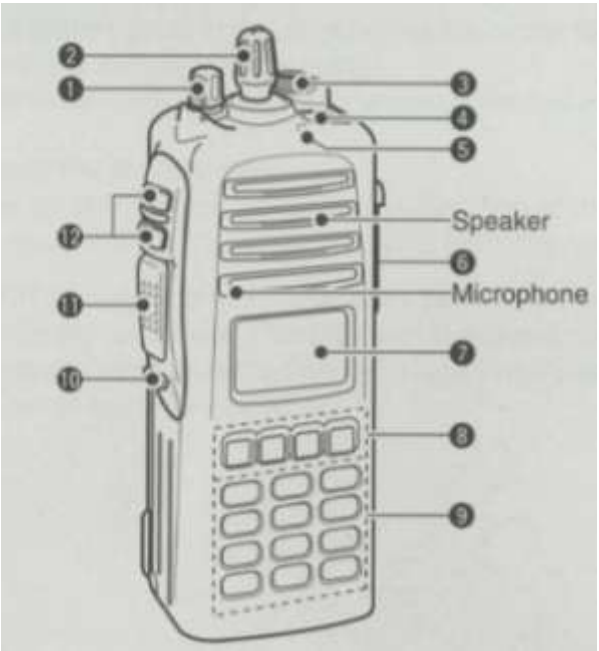
Radios

The Klamath Network currently utilizes Icom FC-F70DT VHF two-way radios for use by the field crew. These radios are light-weight, powerful, fairly robust to field use, and provide a safety measure and logistical contact to local park staff.

It is the responsibility of the field crew to familiarize themselves with radio use and operation. It is the responsibility of the Crew Lead to communicate with the local park staff to establish local radio procedures (e.g., check-ins [if required], call signs).

Any problems with programming or operations should be reported to Klamath Network office staff as soon as possible.

Radio Specifications:
Maximum number of channels: 256
Power: 5 watt
Operational Range: 5 to 7 miles (8 to 11 kilometers), but highly dependent on local conditions.
Battery Life: 14.5 hours of continuous operational use (intermittent crew use should extend this).



1. Power and Volume Control
2. Rotary Channel Selector
3. Antenna Connection
4. Emergency Switch
5. Busy/Transmit Switch (green = receiving/squelch open) (Red = transmitting)
6. Connector cover
7. Display
8. Function Keys
9. Keypad
10. "Monitor Switch" – programmed to "user set"
11. PTT – Push To Talk
12. Up/Down Switches

Basic Operation:

Turn the radio on by rotating knob (**1**) clockwise (this also controls volume).
Rotate knob (**2**) to the appropriate channel (confirm channel on screen [**7**]).
Push PTT button (**11**).

Talk, holding the transmitter upright and 2 to 4 inches from mouth.
Release PTT button (**11**) to receive.

Changing Channels: Depending on the park, location within a park, or the location the radio was last used, the channel zone and channel may need to be changed for proper usages (Contact local park staff to establish proper channels for usage).

Establish the Proper Zone (Table 1):

With the radio on, depress button "P_0" from the Function Keys (**8**).
Use the Up/Down Switches (**12**) to scroll through the zones.
The changing zones will be displayed on the screen (**7**).
Upon finding the correct zone, depress "P_0" to set the zone.

Changing the Channel within the Zone: Turn the Channel Select Knob (**2**) until you reach the proper channel.

In Emergency Situations: If you are in an emergency situation, and you are unable to reach park staff, you have two options.

1. Depress the orange button (**4**). This sends an emergency signal on the currently selected channel (no voice necessary). If you are set on the wrong channel, no one may hear you.
2. Switch the zone to one of the counties closest to you (e.g., Jackson County or Shasta County). Within these zones there are a variety of sheriff and fire fighting settings. Attempt communication with any of these entities.

Useful Information: There are additional tidbits of radio usage that may help the radio operator.

Be Patient – It takes time for a voice message to be received and transmitted. When talking, depress the PTT, wait a second, and then begin to talk. When you are done talking, finish by saying "OVER." This lets the receiver know that you are done talking, so that they can reply. The receiver should wait a few seconds before replying.

Push To Talk – Do not depress this button unless you are actively engaging in talk. Holding this button down will prevent others from talking on this frequency. You may anger people if you abuse the radiowaves.

Battery Life – the battery should last 14 hours or so, for typical usage. If not transmitting or receiving, it should last considerably longer. Keep the battery charged as much as possible. Note that the battery can be charged detached from the radio if needed (e.g., charging a back-up battery). There is a battery life indicator on the display screen in the upper right hand corner. If you anticipate needing longer battery life, contact Klamath Network office staff for extra batteries.

Signal Strength – there is an indicator in the upper left corner of the display.

Scan – Function key "P_1" is set to scan. Depressing the button will cause the radio to scan all zones and all channels (except for NOAA weather forecast zone). Note that if squelch is set low, it may "pick up" static.

Squelch – Squelch is controlled through "user settings." Squelch is basically noise reduction, hiding the background static over a certain threshold. Depending on the channel and your location, the amount of static that needs to be reduced can vary. Generally, increase the squelch until the static just fades out. Changing the squelch will affect all channels in all zones. To set or adjust squelch, follow this procedure:

- With the radio on, depress the "Monitor Switch," (**10**), until the radio beeps.
- This will enter into a series of screens that the user can adjust – there should be little need to change any, except for the squelch.
- Pushing the same button will cycle through options – push repeatedly until SQL appears. A number will be next to it, from 0 – 255. If you are hearing just static, increase the squelch. If you are not hearing transmissions, decrease the squelch.
- Use the up/down switch (**12**) to adjust the squelch.
- Push and hold the "Monitor Switch" (**10**) until the radio beeps again and goes into standard operating mode.
- The effect of changing the squelch will only be heard when you go back into the standard operating mode (e.g., while changing the squelch, you will not get real-time feedback on your changes).
- Adjust as necessary.

Light – You can create a backlight on the screen by depressing button "P_2."

Compander – The compander function can create a clearer signal, if both the receiver and transmitter are equipped with this function. Compander can be turned on and off by depressing button "P_3."

Waterproof – Although the radio is waterproof (down to 1 meter for 30 minutes), do not test this. The radio is very expensive.

NOAA Radio – There are seven different NOAA radio weather forecast frequencies programmed in the radio. If you can pick up a signal, the forecast should be applicable to your area.

Troubleshooting: Although every attempt has been made to ensure that the radios are properly functioning, problems may arise.

"The radio does not turn on."

Confirm that the battery case is fully snapped into place. Depress the latch on the bottom of the radio, and reinsert the battery. Change the battery. If the radio is equipped with a battery unit using AA batteries, change these batteries.

“I can’t hear any transmission, and nobody responds to me.”

Antennae may be loose – tighten it up.

You may be on the wrong channel – try changing channels, and repeat.

Squelch may be to high – adjust squelch to a lower setting, and repeat.

You may be out of range – either try to move closer to the base station or repeater, or move to higher ground to establish line of sight.

For additional problems, return radio to Klamath Network office staff.

Table 1. Currently assigned channels and zones for Klamath Network Icom Radios (as of July 2009). Names are derived from park supplied lists, and are set up according to park specifications (e.g., "channel 1 on a CRLA radio should be channel 1 on KLMN radio, when set to Zone 1). Everything has been done to insure compatibility with park radios.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10
	CRLA	LABE	LAVO	ORCA	REDW	WHIS	KLMN LE	NOAA	Jackson Co.	Shasta Co.
Channel 1	CLNPWA	LABE Local Trans	LNP Direct	None Currently Assigned	NPS Direct	WHIS 1	CLNPWA	NOAA 1	JackSheriff1	CDF dis
Channel 2	CLNPSC	LABE Schonin	LNP Peak		NPS Crescent City	WHIS 2	CLNPSC	NOAA 2	O.P.E.N.	CountyNet
Channel 3			LNP Hark		NPS Requa	WHIS 1 N	LABE 2	NOAA 3	JackSheriff2	CottonwoodFi
Channel 4			LNP Pros		NPS Red Mtn.	WHIS 2 N	SISK SO	NOAA 4	AshlandPOdis	AndersonFi
Channel 5			LNP Tactical 1		NPS School House		REDW DIR	NOAA 5	AshlandFDdis	ReddingFDdis
Channel 6			LNP Tactical 2		NPS Tactical		REDW REP	NOAA 6	AslandSkiPa	ReddingFDta1
Channel 7			NIFC 1		NOAA Weather		LNP PEAK	NOAA 7	PhoenixPOdis	ReddingFDta2
Channel 8			NIFC 2		CDPR Direct		LNP HARK		PhoenixPOtac	ShastaCoSher
Channel 9			LNF Dir		CDPS Pt. St.		WHIS 1		TalentPOdis	ShastaCoStac
Channel 10			LNF Pros		CDPR Requa		WHIS 2		TalentPOtac	ForestNet
Channel 11			LNF Trnr		CDPR Red Mtn.		DOI LE		SoCountFD	ForestNetRep
Channel 12			USFS A2G		CDPR Prairie		KLMNTAC1		MedfordPOdis	TravelNet
Channel 13			CALCORD						MedfordPOtac2	USFSTac1
Channel 14			TGU LOCL						MedfordPOta3	
Channel 15									MedfordFDdis	
Channel 16									NOCountFD	